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IS 10880 (2006): Twistlocks for Lifting Freight Containers
[TED 12: Freight Containers and Pallets]

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(पहला पुनरीक्षण)

Indian Standard

TWISTLOCKS FOR LIFTING FRIEGHT CONTAINERS — SPECIFICATION

(First Revision)

ICS 53.020.30

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

September 2006

Price Group 3

Freight Containers and Pallets Sectional Committee, TED 12

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Freight Containers and Pallets Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was initially published in 1984. The present revision has been undertaken to align it with current practices and to include twistlocks with floating centers.

Lifting twistlocks are used in sets of four in spreaders (lifting frame) for lifting freight containers. The twistlocks provide a means for locating containers to the spreaders suitable for automatic, semi-automatic or manual operating systems. These twistlocks are associated with spigots which place the twistlocks in the corner fittings of the container. The profiles of these twistlocks are such as to provide a degree of flexibility.

While preparing this standard, considerable assistance has been drawn from BS 5237 : 1985 'Lifting twistlocks'.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TWISTLOCKS FOR LIFTING FRIEGHT CONTAINERS — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard specifies dimensions, material, testing and marking for twistlocks that are used in conjunction with freight containers complying with the requirements of IS 6566 and are equipped with corner fittings as specified in IS 7694.

1.2 The attachment of twistlocks to the relevant supporting members is not covered in this standard, nor are the details of safety, interlocks or position indicating device. The end of the shank and the method of the attachment to the operating mechanism and spreader are not specified. They are left to the discretion of the designer.

1.3 This standard does not cover the design feature of twistlocks that are used for location and restraint of freight containers on vehicles.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1369 (Part 3) : 1995	Fasteners — Thread run-outs and undercuts: Part 3 Dimensions for screw thread run-outs and undercuts for internal threads (blind tapped holes) (*third revision*)
4218(Part 3) : 1999	ISO General purpose metric screw threads: Part 3 Basic dimensions (*second revision*)
6566 : 2001	Series 1 freight containers — Classification, dimensions and ratings (*third revision*)
6569 : 1992	Freight containers — Terminology (*second revision*)
7694 : 1992	Series 1 freight containers — Corner fittings — Specification (*second revision*)

3 DFFINITIONS

For the purpose of this standard, the definitions given in IS 6569 shall apply, in addition to the following.

3.1 Twistlocks with Fixed Center — These twistlocks are located at fixed center distance in a lifting frame.

3.2 Twistlocks with Floating Centers — These twistlocks are provided with a degree of lateral and longitudinal movement or float to enable them to position themselves separately with respect to container crane fittings.

4 FORM AND DIMENSIONS

4.1 Twistlock

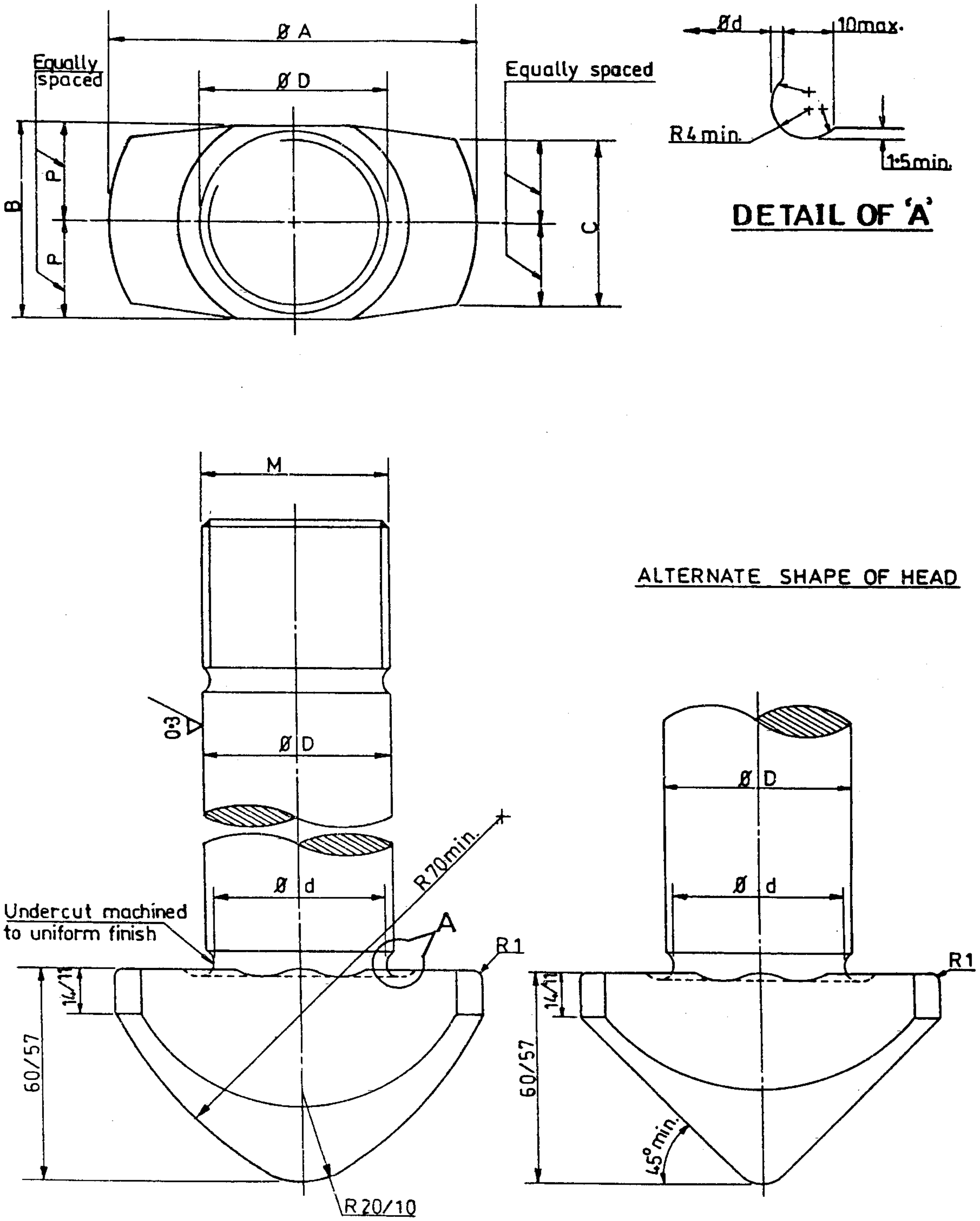
Form and dimensions of the head and adjacent shank area of the twistlocks shall be in accordance with Fig. 1, Tables 1 and 2.

4.2 The dimensions and tolerances between lifting twistlocks shall be as given in Fig. 1, 2, 3 and 4 of IS 7694.

5 MATERIAL

5.1 Twistlocks shall be manufactured from steel forging. The materials shall be selected so that in the finished conditions, the minimum mechanical properties shall be as follows:

Limiting ruling section, mm	150	150	100	63	30	30
Tensile strength N/mm^2	80-95	90-105	100-115	110-125	120-135	155, *Min*
Elongation, percent, *Min* on 5.65 $\sqrt{A}$ gauge length	16	15	13	11	10	6
Brinell hardness number	229-277	255-311	285-341	311-363	341-401	444, *Min*



NOTES

1 All dimensions in millimetres.

2 For detail of lettered dimensions, *see* Table 1.

FIG. 1 DIMENSIONS OF TWISTLOCK

Table 1 Dimensions of Twistlock

(*Clause* 4.1)

Type of Twistlock	Degree of Float	Dimensions Represented in Fig. 1				
		D	*d*	*A*	*B*	*C* (Nominal)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fixed Center	0	54	53 to 53.1	97	56	48
Floating Center	1	55	53 to 54	98	57	49
Floating Center	2	56	53 to 55	99	58	50
Floating Center	3	57	53 to 56	100	59	51
Floating Center	4	58	54 to 57	101	60	52
Floating Center	5 (*Max*)	59	55 to 58	102	61	53
Tolerance	—	+0.1 −0	—	+0 −0.5	+0 −0.25	—

Table 2 Ratings of Lifting Twistlocks

(*Clause* 4.1)

Twistlock Shaft Undercut Diameter (*d*) mm	Safe Working Load *t*	Proof Load *t*
(1)	(2)	(3)
$53 < d < 56$	11	22
$56 < d < 58$	12	24
58	13	26

NOTES

1 Twistlock for head block of gantry cranes to take telescopic spreader shall be of rating SWL 13 *t* or more in all respects, except the dimension "*A*" in Fig. 1 shall be 120 mm minimum.

2 The end of the thread shall have an undercut and fillet in accordance with IS 1369 (Part 3).

3 Length of thread and height of nut shall not be less than the diameter of the shank '*D*'.

4 For securing shank with nut, if they are drilled to take a fixing or retaining pin, the continuous thread length engaged by the nut on the load side shall be at least equal to the diameter of the shank '*D*'.

5 Nuts may be round or hexagonal. Outside diameter of round nut or across corner size of hexagonal nut shall be not less than twice the diameter '*D*' of shaft.

5.1.1 The tempering temperature shall be chosen so that the following impact values are obtained, provided the temperatures are likely to the encountered in services:

Limiting ruling section, mm	150	150	100	63	30	30
Izod impact value, *Min* kg.m	5.5	5.5	4.8	4.1	3.0	1.1

6 RATING

The twistlocks with nuts shall be rated in accordance with the safe working load (SWL) given in Table 2 and on the basis that they shall be used in set of four as component in a lifting frame for lifting freight containers which apply substantially equal load to all twistlocks. Under no circumstances shall the safe working load of the individual twistlocks be exceeded.

7 TWISTLOCK SHAFT

Where the shaft or twistlock is to be threaded, it is recommended that the portion of the thread adjacent to the shaft should have an undercut and fillet in accordance with IS 1369 (Part 3). The basic dimensions of the threads shall be as per IS 4218 (Part 3).

8 TESTING

8.1 Ultrasonic Testing

8.1.1 Before machining the twistlock and nut, forging shall be ultrasonically tested for any crack developed during forging.

8.1.2 After machining and heat-treatment the twistlock with nut shall be subjected to proof load at twice the safe working load given in Table 2.

8.2 Proof Loading

After machining, every twistlock shall be subjected to a proof load in accordance with Table 1. The proof load shall be applied in the manner shown in Fig. 2 which represents the conditions in practice where the fixed spigot is in contact with one side of the top aperture of an upper corner fitting with the aperture being the maximum that is 65 mm.

Every lifting twistlock shall withstand the proof load without showing any permanent set and shall be checked for flaws and defects.

$$P = \frac{B}{2} \text{ as given in Fig. 1 and Table 1}$$

8.3 Impact and Hardness

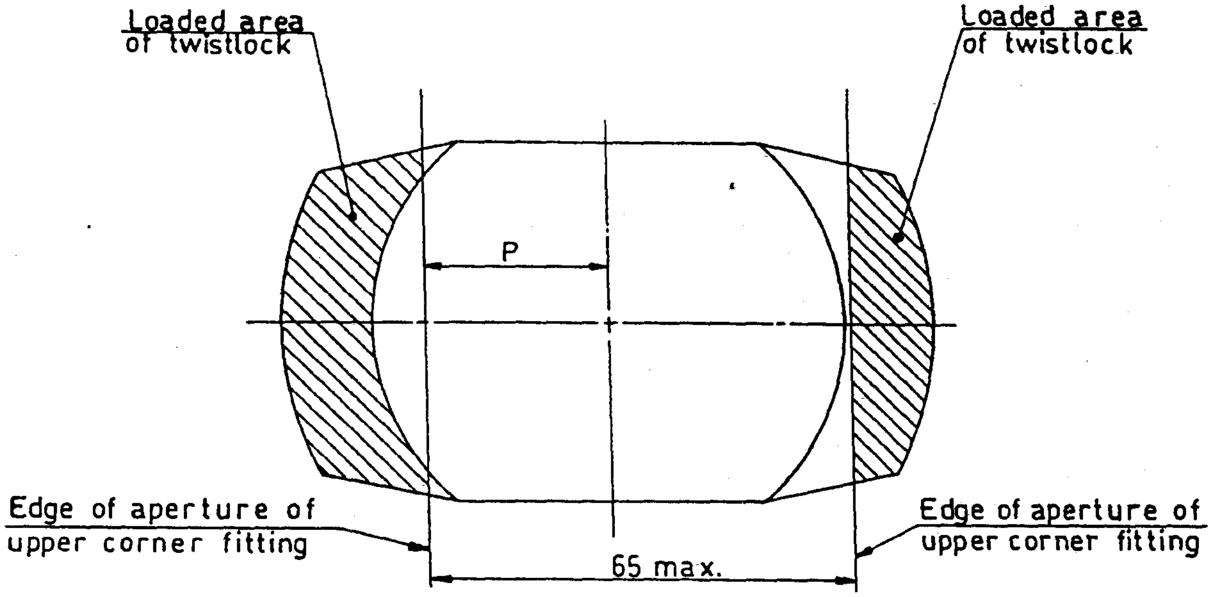
8.3.1 Impact and hardness tests shall be carried out on a representative sample from each heat-treatment batch and details of these tests shall be made available to the purchaser.

8.3.2 Those forgings to be tested shall have suitable prolongations which shall have a diameter approximately equal to the shank section of the forging at the time of heat-treatment and they shall not be finally severed until after heat-treatment.

8.4 Test Certificate

The test certificate shall be supplied for each twistlock stating that it complies with the requirements of this standard, and giving the following information:

a) Distinguished mark,
b) Test loading applied,
c) Safe working load,
d) Details of materials and heat-treatment process, and
e) Signature of person and company responsible for test and examination.


Loaded area of twistlock
Loaded area of twistlock
P
Edge of aperture of upper corner fitting
Edge of aperture of upper corner fitting
65 max.

NOTES

1 All dimensions in millimetres.

2 Dimension P = ½ dimension B in Fig. 1 and Table 1.

FIG. 2 METHOD OF LOADING FOR PROOF LOADING

Certificates giving impact values and results of hardness tests carried out on a sample of the heat-treatment batch referred to in **8.3** shall be supplied together with the results of any additional tests which have been carried out.

9 SAMPLING

9.1 Lot

For the purpose of the standard all twistlocks of the same type and relating to the same heat-treatment batch shall constitute a lot. If the consignment consists of a number of heat-treatment batches then two or more lots shall be formed in terms of heat-treatment batches. Each lot shall be tested separately for judging the conformity of the material to the requirement of this standard.

9.2 Dimensional Requirements

From each lot sample of twistlocks shall be drawn at random according to Table 3.

9.2.1 Any twistlock which fails in one or more dimensions given in Table 2 shall be considered as defective. The lot shall be accepted under this clause if the number of defective twistlocks in the sample does not exceed the acceptance number given in col 3 of Table 3.

9.3 Material

For each lot one sample shall be tested for the requirements of material (*see* **5.1**) and the certificate shall be made available to the purchaser.

9.4 Impact and Hardness Test

Two tests shall be conducted for each lot for impact and hardness requirements. Both the samples shall pass if the lot is to be accepted under this clause.

10 MARKING

10.1 Each twistlock, after tensile testing, shall be permanently and legibly marked on the side of the head with the following:

a) Safe working load,

b) Such individual markings as will allow identification with the test certificates, and

c) Date of manufacture (month and year).

10.2 BIS Certification Marking

The twistlocks may also be marked with the Standard Mark.

10.2.1 The use of the standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Table 3 Scale of Sampling for Dimensional Requirements

(*Clauses* 9.2 *and* 9.2.1)

Lot Size (*N*) (1)	Sample Size (*n*) (2)	Acceptance Number (*a*) (3)
Up to 100	8	0
101 to 300	13	0
301 to 500	20	0
501 to 1 000	32	1
1 001 and above	50	1

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

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